Non-parametric models

Idea: we don't need a model, just the dataset is enough to provide the solution. These things are called non-parametric models.

Before

① you have a target function $f: X \longrightarrow Y$ and a dataset $D = \{(x_m, t_m)_{m=1}^{N}\}$

② you create some kind of model $\hat{f}(x; \theta)$ parametrized with a set of parameters θ;

③ you use the dataset to find the best value for this set of parameters (e.g. with maximum likelihood) θ^*.

④ you can predict values outside of the dataset $x' \notin D$ with $\hat{f}(x'; \theta^*)$.

After

① you have a target function $f: X \longrightarrow Y$ and a dataset $D = \{(x_m, t_m)_{m=1}^{N}\}$

② you try to directly guess the value of the target function without an explicit definition of a model
$$D = \{(x_m, t_m)\}_{m=1}^{N}$$

③

$$x \notin D \longrightarrow \boxed{\text{Algorithm}} \longrightarrow y'$$

The output is computed directly from the dataset and the input without defining a model, a set of parameters and finding their optimal value.